

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claim 1 (original): A diamond electron emission device comprising a light emitting device for irradiating light to a cathode, wherein at least an electron emission face of said cathode is made of diamond.

Claim 3 (currently amended): A diamond emission device according to claim 1 ~~or 2~~, wherein said electron emission face of said cathode is an n-type diamond semiconductor.

Claim 4 (currently amended): A diamond emission device according to claim 1 ~~or 2~~, wherein said electron emission face of said cathode is a p-type diamond semiconductor.

Claim 5 (original): A diamond electron emission device according to claim 4, wherein said p-type diamond semiconductor includes crystal defects or an sp<sup>2</sup> component.

Claim 6 (currently amended): A diamond electron emission device according to ~~any one of claim 1 through claim 5~~, wherein said electron emission face of said cathode is hydrogen terminated.

Claim 7 (currently amended): A diamond electron emission device according to ~~any one of claim 1 through claim 5~~, wherein said electron emission face of said cathode is oxygen terminated.

Claim 8 (currently amended): A diamond electron emission device according to ~~any one of claim 1 through claim 7~~, wherein said light emitting device is composed of a pn junction of diamond, a schottky junction or a MIS structure.

Claim 9 (currently amended): A diamond electron emission device according to ~~any one of claim 1 through claim 8~~, wherein said electron emission face of said cathode contains a sharpened projection part.

Claim 10 (currently amended): A diamond electron emission device according to ~~any one of claim 1 through claim 9~~, wherein wavelength energy of light emitted from said light emitting device includes 5.0 - 5.4 eV.

Claim 11 (currently amended): A diamond electron emission device according to ~~any one of claim 1 through claim 10~~, wherein wavelength energy of light emitted from said light emitting device is equal to or greater than 2.0 eV.

Claim 12 (currently amended): A diamond electron emission device according to ~~any one of claim 1 through claim 11~~, wherein light from said light emitting device excites electrons in an impurity level to a conduction band.

Claim 13 (currently amended): A diamond electron emission device according to ~~any one of claim 1 through claim 11~~, wherein light from said light emitting device excites electrons in a band gap level to a conduction band.

Claim 14 (currently amended): A diamond electron emission device according to ~~any one of claim 1 through claim 11~~, wherein light from said light emitting device excites electrons in a level resulting from any of following components of p-type diamond: graphite; non-crystalline carbon; diamond-like carbon; fullerene; lattice defect; dislocation defect or grain boundary defect, to a conductive band.

Claim 15 (original): A diamond electron emission device according to claim 3, wherein said n-type diamond contains as an impurity at least one element among nitrogen, phosphorous, sulfur and lithium, or any one of said elements and boron.

Claim 16 (currently amended): A diamond electron emission device according to ~~any one of claim 1 through claim 15~~, wherein said light emitting device is composed as one unit with said cathode.

Claim 17 (original): An electron beam source utilizing a diamond electron emission device, wherein a light emitting device for irradiating a cathode and a cathode, in which at least an electron emission face is diamond, are disposed together in an electron gun.

Claim 18 (original): An electron beam source utilizing a diamond electron emission device according to claim 17, wherein:

an anode is separated by a space from said cathode, in which at least an electron emission face is diamond; and

a voltage that is positive relative to said cathode is applied to said anode.

Claim 19 (original): An electron beam source utilizing a diamond electron emission device according to claim 18, wherein a control electrode is disposed between said cathode and said anode to regulate an emission electron current from said cathode.